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Usefulness and feasibility of comprehensive and less comprehensive vocational rehabilitation for patients with chronic musculoskeletal pain: perspectives from patients, professionals, and managers

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ABSTRACT

Purpose: To explore the usefulness and feasibility of a comprehensive vocational rehabilitation (C-VR) program and less comprehensive (LC-VR) program for workers on sick leave due to chronic musculoskeletal pain, from the perspective of patients, professionals, and managers.

Materials and methods: Semi-structured interviews were held with patients, professionals, and managers. Using topic lists, participants were questioned about barriers to and facilitators of the usefulness and feasibility of C-VR and LC-VR. Thirty interviews were conducted with thirteen patients ($n = 6$ C-VR, $n = 7$ LC-VR), eight professionals, and nine managers. All interviews were transcribed verbatim. Data were analyzed by systematic text condensation using inductive thematic analysis.

Results: Three themes emerged for usefulness ("patient factors," "content," "dosage") and six themes emerged for feasibility ("satisfaction," "intention to continue use," "perceived appropriateness," "positive/negative effects on target participants," "factors affecting implementation ease or difficulty," "adaptations"). The patients reported that both programs were feasible and generally useful. The professionals preferred working with the C-VR, although they disliked the fixed and uniform character of the program. They also mentioned that this program is too extensive for some patients, and that the latter would probably benefit from the LC-VR program. Despite their positive intentions, the managers stated that due to the Dutch healthcare system, implementation of the LC-VR program would be financially unfeasible.

Conclusions: The main conclusion of this study is that it is not useful to have one VR program for all patients with CMP and reduced work participation, and that flexible and tailored-based VR are warranted.

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Qualitative research; tailored intervention; workplace intervention; return to work; implementation research

► IMPLICATIONS FOR REHABILITATION

- Both comprehensive and less comprehensive vocational rehabilitation are deemed useful for patients with chronic musculoskeletal pain and reduced work participation. Particular patient factors, for instance information uptake, discipline, willingness to change, duration of complaints, movement anxiety, obstructing thoughts, and willingness to return to work might guide the right program for the right patient.
- Both comprehensive and less comprehensive vocational rehabilitation are deemed feasible in practice. However, factors such as center logistic (schemes, rooms, professionals available) and country-specific healthcare insurance and sickness compensation systems should foster the implementation of less comprehensive programs.

Introduction

Chronic musculoskeletal pain (CMP) is a common condition that contribute to disability, a decline in work participation, and substantial costs [1,2]. Multidisciplinary bio-psychosocial programs, such as vocational rehabilitation (VR), are advocated to enhance the work participation of sick-listed workers with CMP [3,4]. VR is defined as "a multiprofessional evidence-based approach to optimize work participation that includes various services and activities provided in different settings to working age individuals

with health related impairments, limitations, or restrictions in work functioning" [5]. A review found that working-age adults on sick leave with musculoskeletal disorders who received VR saved 40 days of sick leave at twelve months follow-up compared to care as usual [6]. Another review showed that VR saved 1.11 (interquartile range 0.32–3.20) sick-leave days per month compared to care as usual [7].

In general, the content of VR programs covers three bio-psychosocial domains: (a) health-focused (i.e., health services intervention subcategories, such as graded activity/exercise, cognitive

behavioral therapy (CBT), education, work-hardening); (b) service coordination (i.e., improving communication within the workplace or between the workplace and healthcare providers); and (c) work modification (i.e., modified duties, modified working hours, supernumerary replacements, ergonomic adjustments or other worksite adjustments) [8]. Some modules are executed in a group, such as education and CBT, and others are executed in a one-to-one setting, such as sessions with a case manager or psychologist. Nonetheless, VR programs can vary widely in terms of content [4,9], and it is unclear how many contact hours of each type of content are necessary to achieve the best results [7,9–12]. The latter issue is illustrated by a review that showed that effective multidisciplinary VR programs for patients with CMP ranged from fewer than six contact hours to more than 70 contact hours [7]. Another review showed that pain rehabilitation programs ranging from seven to 197 contact hours were effective in enhancing the work participation of patients with CMP [9]. In addition, the two preceding reviews showed that VR was on average effective, while some interventions may be ineffective and others effective. Furthermore, three randomized controlled trials (RCTs) showed that VR programs with different numbers of contact hours (18.5-h vs 52-h [13], 15-h vs 120-h [14], 10-h vs 120-h) [15,16], respectively, were non-inferior to each other with regard to enhancing the work participation of sick-listed workers with CMP. Moreover, one of these RCTs [15,16] showed that three programs with different contact hours were non-inferior to each other, but the authors also showed that patients with a complex and poor prognosis for return to work seemed to benefit from a long program while those with a good prognosis for return to work seemed to benefit from a short program. Thus, case complexity may play a role in the issue of program allocation/tailored care.

Despite growing evidence that less comprehensive VR (LC-VR) might be non-inferior compared to comprehensive (C-VR), little uptake has been observed in clinical practice, apart from controlled studies. One possible explanation for this is that VR is often complex [17], as it consists of many elements, involves many stakeholders, and is embedded in an administrative, financial, and social context [18]. When implementing a new intervention in clinical practice, it is recommended that the opinions of patients, professionals, managers, and policymakers regarding the feasibility and usefulness of the intervention are taken into account [18–20]. Usefulness is defined as the suitability of an intervention for the intended purpose and the extent to which it meets the needs of important users [21]. It can encompass three dimensions: usefulness on an individual level, on an organizational level, and of the intervention itself [21]. Feasibility studies can help us to evaluate and prioritize whether or not it will be feasible to conduct a new intervention, and whether all the necessary components of the new intervention will work together effectively [19,22]. The feasibility of an intervention can encompass different areas, such as the satisfaction of target participants, the appropriateness of the intervention for patients, the effect of the intervention on the organization, the effect of the intervention on participants, implementation factors, and adaptations [19].

In the Netherlands, a number of rehabilitation centers perform care-as-usual multidisciplinary C-VR programs of ~100 contact hours. The C-VR program consists of health-focused modules (fitness/graded activity, CBT, group education, and relaxation) and return to work (RTW) coordination (service coordination and work modifications). In an RCT, the C-VR program was compared with a less comprehensive program (LC-VR) of ~40 contact hours [23]. The LC-VR program comprised a fixed part (RTW coordination) and a tailored part consisting of individually-chosen components of the

C-VR program's health-focused modules. The RCT was conducted between November 2014 and January 2016 (more information about the RCT is provided in a study protocol paper [23]). As the necessary inclusion rate was hampered, however, the study was discontinued. Nonetheless, eight patients completed the LC-VR program and six patients completed the C-VR program. The aim of this paper is to explore the usefulness and feasibility of a C-VR program and a LC-VR program for workers on sick leave due to chronic musculoskeletal pain, from the perspective of patients, professionals, and managers.

Materials and methods

The consolidated criteria for reporting qualitative research (COREQ) checklist was used when designing the study [24].

Participants

For this qualitative study, three groups of stakeholders were interviewed:

- i. patients who had completed LC-VR or C-VR (in the period November 2014 – January 2016; as part of the earlier mentioned RCT [23]);
- ii. professionals, physiotherapists, psychologists, return to work (return to work) coordinators, who had executed at least one LC-VR program and who had several years of experience with the C-VR program;
- iii. four managers from rehabilitation centers who had executed the LC-VR and the C-VR programs (as part of the RCT [23]), and five managers from rehabilitation centers who solely executed the C-VR program. These five managers were included in this study in order to enrich our understanding of program feasibility.

Professionals and managers included for this study were from nine rehabilitation centers located throughout the Netherlands. These nine rehabilitation centers together were part of the “Dutch network vocational rehabilitation,” aiming to offer similar VR. Key roles of the managers were ensuring of meeting the annual budget and facilitating the functioning of all professionals involved in the VR program. Besides VR there were managers with other departments to manage. This was in general the case for managers from centers with a low rate of VR patients (see Table 1).

The vocational rehabilitation programs

Comprehensive vocational rehabilitation

The comprehensive vocational rehabilitation (C-VR) program was a multidisciplinary bio-psychosocial group-based outpatient program that consisted of five modules: RTW coordination, fitness/graded activity, CBT, group education, and relaxation. RTW coordination consisted of service coordination (communication part: individual sessions with the patient, conduct a RTW plan, and a workplace visit, including a conversation with the patient and supervisor/employer) and work modifications (ergonomic part). A detailed description of the content of the C-VR program can be found elsewhere [23]. The C-VR program covered approximately 100 contact hours and lasted fifteen weeks, with two contact moments of approximately 3.5 h/session each week.

Less comprehensive vocational rehabilitation

The less comprehensive vocational rehabilitation (LC-VR) program was a multidisciplinary bio-psychosocial group-based outpatient program that consisted of a fixed part (RTW coordination, ~10 h)

Table 1. Participants' characteristics.

Name ^a	Gender and age	Years of work experience ^b	Number of patients referred to VR per year ^c	Participating trial center?	Profession
(a) Managers					
Alex	M47	4	<i>N</i> = 123	Yes	Manager
Rudy	M54	11	<i>N</i> = 370	Yes	Manager
Bernard	M58	12	<i>N</i> = 93	Yes	Manager
Peter	M39	6	Unknown	No	Manager
Johan	M72	3	<i>N</i> = 92	Yes	Manager
Megan	F53	1	<i>N</i> = 31	No	Manager
Tim	M45	1	Unknown	No	Manager
Harold	M56	15	Unknown	No	Manager
Simon	M36	3	<i>N</i> = 78	No	Manager

^aPseudonyms are used for privacy reasons.

^bWork experience of working with the care as usual C-VR program.

^cMean referred patients over period 2016–2018.

(b) Professionals					
Name ^a	Gender and age	Years of work experience ^b	Experience with <i>N</i> LC-VR patients	Participating trial center?	Profession
Jacob	M30	4	<i>N</i> = 1	Yes	Physiotherapist
Karen	F40	4	<i>N</i> = 1	Yes	Reintegration specialist
Jill	F39	18	<i>N</i> = 2	Yes	Physiotherapist & reintegration specialist
Anna	F59	5	<i>N</i> = 2	Yes	Psychologist
Ellen	F35	6	<i>N</i> = 3	Yes	Psychologist
Lynn	F42	6	<i>N</i> = 3	Yes	Reintegration specialist
Lea	F33	4	<i>N</i> = 1	Yes	Psychologist
Carol	F43	9	<i>N</i> = 1	Yes	Physiotherapist

^aPseudonyms are used for privacy reasons.

^bYears of work experience of working with the care as usual (i.e., C-VR) program.

(c) Patients

Name ^a	Gender and age	Treatment allocation	Work status	Pain status	Civil status	Educational status ^b
Owen	M63	LC-VR	Full sick leave	CMP	Single	Low
Ava	F31	LC-VR	Part sick leave	SMP	In a relationship	Medium
June	F28	LC-VR	Part sick leave	SMP	In a relationship	High
Kim	F35	LC-VR	Full sick leave	SMP	In a relationship	High
Alice	F46	C-VR	Full sick leave	CMP	In a relationship	High
Stan	M50	LC-VR	Full sick leave	SMP	In a relationship	Other
Izzy	F51	C-VR	Full sick leave	CMP	In a relationship	Medium
Mike	M54	LC-VR	Full at work	CMP	In a relationship	Low
Rose	F45	C-VR	Full sick leave	CMP	In a relationship	Other
Britt	F65	C-VR	Part sick leave	SMP	In a relationship	Low
Tess	F52	C-VR	Part sick leave	CMP	In a relationship	Other
Ron	M59	LC-VR	Full sick leave	CMP	In a relationship	Medium
Lauren	F33	C-VR	Part sick leave	CMP	In a relationship	Medium

^aPseudonyms are used for privacy reasons.

^bLow: primary school, lower vocational education, and lower secondary school, medium: intermediate vocational education and upper secondary school, high: upper vocational education or university.

CMP: chronic musculoskeletal pain; SMP: subacute musculoskeletal pain.

and a tailored part (~30h). The content of the tailored part was based on a VR-team decision taken after a multidisciplinary screening; only those modules that were deemed most useful were chosen. The LC-VR program covered a maximum of 40h over fifteen weeks. In general, the program was based on the following blueprint: weeks 1-5, two sessions/week; weeks 6–10, one session/week; weeks 11–15, 2–3 sessions in five weeks. Professionals were free to change this blueprint.

Context

The stakeholders in this study fell under the Dutch sickness compensation and healthcare system. When an employee is sick-listed in the Netherlands, both the employee and employer are responsible for the work participation process during the first two years of sick leave. According to the Dutch Gatekeeper Improvement Act, the employer has to provide wage replacement during this two-year period [25]. If a sick-listed employee is referred to VR

and RTW coordination is deemed necessary, the cost of this module (approximately €1,200) must be reimbursed by the employer. The other modules of VR (i.e., fitness, CBT, relaxation therapy, group education, etc.) are reimbursed by healthcare insurers. The amount that is reimbursed by healthcare insurers depends on a number of reimbursement factors, such as program duration, group size, the number of professionals in a group, whether it is individual or group care, and so forth. In particular cases, several additional hours or weeks can make a difference in program reimbursement of thousands of euros.

Data collection

Semi-structured telephone interviews were conducted between the interviewer and stakeholders. There were no other people present during the interviews. The interviews were held between June and October 2016. All interviews were held by TB (male, exercise therapist, health scientist, PhD candidate, participated in

a course on conducting Qualitative Health Research). Thirty-two interviews were planned: patients $n=14$ (LC-VR: $n=8$; C-VR $n=6$), professionals $n=8$, and managers $n=10$ (experiences with LC-VR and C-VR: $n=4$; experiences with C-VR: $n=6$). This recruitment resulted in 30 interviews; $n=9$ with managers, $n=8$ with professionals, and $n=13$ with patients. The response rate of the interviews was 30 out of 32 participants (94% response rate). One manager refused to participate because he was working on an interim basis, and one patient refused to participate. Two professionals per participating center were included. Of the patients, $n=7$ out of 8 had participated in the LC-VR program and $n=6$ out of 6 had participated in the C-VR program. General characteristics of the interviewed participants are shown in Table 1.

Topic lists were used as a framework for the interviews; these lists included topics on the usefulness and feasibility of the LC-VR and C-VR programs. Logical reasoning was used to develop the usefulness topics, while the feasibility topics were derived from a range of sources [19,26,27]. The patients and professionals were questioned about the usefulness, feasibility, barriers to and facilitators of both programs. The managers were asked about feasibility, barriers to and facilitators of the program(s). The professionals and managers were asked about a hypothetical situation in which the LC-VR program was implemented as the new care-as-usual program and the C-VR program was continued as the care-as-usual program. Patients were asked to indicate their satisfaction with the allocated program on a 0-10 scale (0 = not satisfied at all, 10 = very satisfied). Patients were also asked to evaluate the usefulness of each program module. Two pilot interviews were performed (with a professional and a manager) to test the topic list and to train the interviewer in the interview process. After this pilot phase, the final topic lists were produced (Online Resource 1).

A few days before each interview, an e-mail and a letter with information about the interview were sent to each stakeholder. The letter explained that the interview was confidential, and asked for permission to audiotape the interview and save the audio file and transcription for fifteen years. This storage time is in accordance with the institutional research code [28]. Before each interview, the same information was repeated and informed consent was given. The patients had already given their written informed consent as part of an RCT [23] and the professionals and managers gave their consent verbally before the start of the interview. Participants were asked to state their opinions openly, and it was explained that there were no good or bad answers. During the interviews, the topic list was used as a blueprint; the sequence was not followed strictly, but at the end of each interview, all points of the topic list were completed. Probes were used as an interview technique to get deeper insights. After completion of the interviews, field notes were written down as soon as possible. The field notes consisted of descriptive information such as the date and time, setting, action, behavior, and conversations observed; and reflective information such as thoughts, ideas, questions, and concerns raised in the interview. Patients' characteristics were obtained from baseline questionnaires from an RCT [23].

Data analyses

We conducted an inductive thematic analysis of the data following the guidelines of Braun [29]. A realist approach was used to report the experiences, meanings, and reality of the participants [29]. All interviews were audiotaped and transcribed verbatim. The interviews were transcribed by the interviewer and an assistant, and all transcriptions were verified and corrected by the first author. The analysis was performed in a series of five steps: (1) familiarization

with the data; (2) generation of initial codes; (3) searching for themes; (4) defining and naming themes; and (5) producing the report [29]. Three transcriptions per stakeholder were analyzed in duplicate (patients: first author and fourth author MR; professionals: first author and second author JVV; managers: first author and last author MFD). The codes and themes that emerged from the data were compared and discussed until consensus on a preliminary set of labels was reached. The preliminary set of themes, codes and labels based on the first three interviews from each participant group were used as a reference point during the forthcoming interviews and analysis. The forthcoming analysis were performed by TB.

The development of the code was executed in different steps. In an early phase, one code tree per participant group was developed, thus three code trees in total. However, because there was a lot of duplication in themes and labels, it was decided to create two code trees (one on usefulness and one on feasibility) with a more close relation to the research aim. Another advantage of these two code trees was that the themes and codes of the three participant groups were merged. This was deemed better for the readability of the manuscript and for answering the research question. Consensus was reached with all authors about the final code tree. The report was produced with reference to the areas of feasibility used by Bowen *et al.* [19]. When describing the results, codes were placed in bold, and statements by the three stakeholders were abbreviated as PT (patients), PR (professionals), and MA (managers). Pseudonyms were used to ensure the anonymity of the participants. The interviews were analyzed using the computer software program MAXQDA version 12 (VERBI Software. GmbH Berlin, Germany 2015).

Results

Interviews

The $n=30$ interviews lasted 16–46 min (mean 27 ± 7 min), excluding the introduction time. When the final interviews were analyzed, we saw the same categories, rather than new categories, indicating data saturation. Nevertheless, per theme new arguments emerged until the end of the analysis.

Themes

Code trees for usefulness and feasibility were developed (Online Resource 2–3). From these, three themes emerged for usefulness ("patient factors," "content" and "dosage"), and six themes emerged for feasibility ("satisfaction," "intention to continue use," "perceived appropriateness," "positive/negative effects on target participants," "factors affecting implementation ease or difficulty," and "adaptations").

Usefulness

Patient factors

The professionals mentioned that the LC-VR program was useful for some of the patients referred to VR, but not for all of them.

I think that it's suitable for some and not for others. (Jacob, physiotherapist, 30 years old)

However, they also stated that the C-VR program did not suit all patients, either.

I expect that it [i.e. LC-VR program] would indeed be good for a certain group, but there are also people who, well, who need slightly more intensive guidance [i.e. C-VR program]. (Ellen, psychologist, 35 years old)

To guide which program would be useful for which “type” of patients, the professionals mentioned various patient factors. These were clustered into five categories: intelligence, behavioral, complaints, mental, and work).

Intelligence

According to the professionals, high levels of **education, knowledge, and information uptake** are facilitating factors to participate in a LC-VR program.

People who have a lot of knowledge and insight, who can process things more quickly and who are able to change themselves a bit. (Lynn, reintegration specialist, 42 years old)

People, I think, who are also able, yes, to pick things up quickly, who are perhaps more independent in that sense. (Ellen, psychologist, 35 years old)

In contrast, it was stated that patients with lower levels of these three factors would benefit more from the C-VR program.

Behavioral

According to the professionals, **proactive and disciplined** patients with a high level of **self-direction, willingness to change, and the ability to train independently**, are facilitating factors to participate in a LC-VR program.

I think, especially people with a very proactive coping style, who are, um, rapidly encouraged to take charge of things. (Lea, psychologist, 33 years old)

It requires a degree of discipline to pick things up at home or in any case from home, such as sports, and to also apply other things, that takes discipline. (Karen, reintegration specialist, 40 years old)

Low level of discipline, low self-direction, low willingness to change, and needing much accompaniment are barriers to participate in a LC-VR program. The C-VR program was suggested as more useful for patients with these latter factors.

People who simply find it difficult to take charge of the process, the rehabilitation process, for them, I think 40 hours is too little. (...) We also see a lot of people who are not really able to work out independently. (Jacob, physiotherapist, 30 years old)

Complaints

According to the professionals, the LC-VR program will be useful for patients with **subacute complaints**, the absence of **psychosocial problems/complaints**, and high physical and mental **capacity**. The LC-VR program was mentioned not useful for patients with **fibromyalgia, chronic fatigue, multi-problems**, low capacity and **complex** patients. The C-VR program was proposed more useful for patients with these latter factors.

Those who, when it comes to taking things on, mentally and physically, have so little resilience that they first have to build up a certain degree of strength before they are able to do anything at all meaningful at work. (Lynn, reintegration specialist, 42 years old)

Where, for example, there are problems on multiple levels, where there are problems at work and at home, yes, how to put it, intrinsically, so

Table 2. Patient-related factors determining the usefulness of C-VR or LC-VR according to professionals.

Category	Patient-related factors determining the usefulness of the C-VR program	Patient-related factors determining the usefulness of the LC-VR program	Participant	Quotation
Intelligence	Low level of education	High level of education	Lynn, PR	LC-VR: The people who are already more proactive, who are slightly more independent, perhaps further on in the process, too, and a bit more highly educated.
	Low level of knowledge	High level of knowledge	Lynn, PR	LC-VR: People who have a lot of knowledge and insight, who can process things more quickly and who are able to change themselves a bit.
	Low level of information uptake	High level of information uptake	Ellen, PR	LC-VR: People, I think, who are also able, yes, to pick things up quickly, who are perhaps more independent in that sense.
Behavioral	Not proactive person	Proactive person	Lea, PR	LC-VR: I think, especially people with a very proactive coping style, who are, um, rapidly encouraged to take charge of things.
	Low level of self-direction	High level of self-direction	Jacob, PR	LC-VR: People who simply find it difficult to take charge of the process, the rehabilitation process, for them, I think 40 hours is too little.
	Low level of discipline	High level of discipline	Karen, PR	LC-VR: ... it requires a degree of discipline to pick things up at home or in any case from home, such as sports, and to also apply other things, that takes discipline.
	Low level of willingness to change ^a	High level of willingness to change	Carol, PR	LC-VR: Willingness to change, looking at themselves, that kind of factors.
Complaints	Patient cannot train independently	Patient can train independently	Jacob, PR	LC-VR: We also see a lot of people who are not really able to work out independently.
	Fibromyalgia	No fibromyalgia ^a	Lea, PR	C-VR: I think for example fibromyalgia or chronic fatigue like ...
	Chronic fatigue	No chronic fatigue ^a	Lea, PR	C-VR: I think for example fibromyalgia or chronic fatigue like ...
	Chronic complaints ^a	Subacute complaints	Jill, PR	LC-VR: Someone who hasn't been out for very long ... who's at a very early stage in the process ... yes, the subacute or when C-VR is used as a prevention program.
	Low capacity ^b	High capacity	Lynn, PR	C-VR: Those who, when it comes to taking things on, mentally and physically, have so little resilience that they first have to build up a certain degree of strength before they are able to do anything at all meaningful at work.
	High / much psychosocial problems	No / low psychosocial problems	Anna, PR	LC-VR: ... where less psychosocial problems play a role.
			Anna, PR	C-VR: ... then you see that it really is a very considerable problem and yeah, that it's therefore not only a work problem, but also a psychosocial problem, one that's often very, very complicated, too.

(continued)

Table 2. Continued.

Category	Patient-related factors determining the usefulness of the C-VR program	Patient-related factors determining the usefulness of the LC-VR program	Participant	Quotation
Mental	Multi-problems	No multi-problems ^a	Jacob, PR	C-VR: ... where, for example, there are problems on multiple levels, where there are problems at work and at home, yes, how to put it, intrinsically, so it's more that people are coming up against their own difficulties, yes, good. On a psychological level, but also in dealing with and accepting their symptoms.
	Complex patients	No complex patients ^a	Jill, PR	C-VR: ... that people have often tried something else and when that really hasn't worked, then the [name of center] comes up, so yes, if it doesn't work there anymore, then ... you know.
	Movement anxiety	No movement anxiety	Lynn, PR	C-VR: People with a lot of anxiety associated with movement, who just need a little more attention to be able to overcome that anxiety too.
	Obstructive thoughts	No obstructive thoughts ^a	Lea, PR	LC-VR: If they nevertheless dare to train at the gym, while they are afraid. Still dare to train, even if it's painful, then some people will conclude more quickly, um, OK, I can do it, so I'll start working on my development.
			Lea, PR	C-VR: It depends on the extent of that obstructive thought. As a psychologist, yeah, that's something you can't express in numbers, say, but you can talk about certain gradations. Um, let's think, for example, I now have someone training and, um, now, well, that one frets a little about pain and fatigue, but other people really fret day in, day out, and then it obstructs them much more in their daily life. So there's a difference of gradation there. And the degree of gradation also determines how much work you have to put in in order, um, to reduce that gradation.
			Lynn, PR	C-VR: I think people who generally chose the C-VR program, that people are what I just said, who feel pretty insecure.
	Uncertain patients	Confident patients ^a	Lynn, PR	LC-VR: ... yet the problem around his pain experience and his cognitions were much stronger, and that we did not get that turned around in the LC-VR program, not even a start with that.
	Low cognitions	High cognitions ^a	Anna, PR	LC-VR: ... but also in dealing with and accepting their complaints.
	Low acceptance of complaints	Acceptance of complaints ^a	Jacob, PR	LC-VR: ... where it really concerns a work-related question.
	Work factors	Work participation not treatment goal ^a	Work participation as the treatment goal	Anna, PR
No willingness to return to work ^a		Willingness to return to work	Anna, PR	LC-VR: ... who has already taken some steps in the direction of work.
Has not made steps towards work reintegration ^a		Has made steps towards work reintegration	Anna, PR	C-VR: people who have a worse relationship with the employer.
Bad relationship with employer		Good relationship with employer ^a	Lea, PR	C-VR: people with more long-term symptoms, that is, people who may have been on sick leave for over a year.
Long time off work		≤ one year off work ^a	Carel, PR Anna, PR	C-VR: sometimes they've been at home for even longer, meaning they've been out of the work environment for longer, perhaps then it all gets worse in their head, so they're no longer able to pick up the thread, yes, I think that could really be one of the factors.

C-VR: comprehensive vocational rehabilitation; LC-VR: less comprehensive vocational rehabilitation; NM: not mentioned.

^aPatient-related factor which was not explicitly mentioned by professionals but rather indirect (implicit). For example: the codes "Low level of willingness to change" and "High level of willingness to change,"¹ were mentioned as useful (i.e., high level) and not useful (i.e., low level) patient factors for the LC-VR program, but were not explicitly mentioned as a patient-related factor determining the usefulness of the C-VR program. The professionals however implicitly mentioned that such *not useful* patient-related factors for the LC-VR program (in this example low level of willingness to change) was in fact an eligible (useful) patient factor for the C-VR program.

^bGeneral capacity, mental capacity, and physical capacity together.

it's more that people are coming up against their own difficulties, yes, good. On a psychological level, but also in dealing with and accepting their symptoms. (Jacob, physiotherapist, 30 years)

Dare to train at the gym (...), even if it's painful, then some people will conclude more quickly, um, OK, I can do it, so I'll start working on my development. (Lea, psychologist, 33 years old)

Mental factors

According to the professionals, the LC-VR program was useful for patients with the absence of **movement anxiety** and low levels of psychosocial problems.

The LC-VR program will not be useful for patients with **obstructing thoughts**, low **cognitions**, **psychological complaints**, low **acceptance** of complaints, and **uncertain patients**. The professionals stated that the C-VR program is useful for patients with high levels of psychosocial problems and movement anxiety, and uncertain patients.

Table 3. Usefulness of the content of the C-VR and LC-VR programs, as mentioned by patients.

Content	C-VR		LC-VR	
	Useful content	Not useful content ^a	Useful content	Not useful content ^a
Relaxation	x	x	x	x
Fitness	x		x	
Psychologist	x	x	X	x
Group education	x	x	X	x
RTW coordination - ergonomic part	x	x	X	x
RTW coordination - communication part	x		X	
Movement teacher ^b	x		X	
Aquatic exercises ^c	x		X	

C-VR: comprehensive vocational rehabilitation; LC-VR: less comprehensive vocational rehabilitation; RTW: return to work.

^a“Partly useful” and “Not useful” taken together.

^bUndertaken at two centers.

^cUndertaken at one center.

It depends on the extent of that obstructive thought. As a psychologist, yeah, that's something you can't express in numbers, say, but you can talk about certain gradations. Um, let's think, for example, I now have someone training and, um, now, well, that one frets a little about pain and fatigue, but other people really fret day in, day out, and then it obstructs them much more in their daily life. So there's a difference of gradation there. And the degree of gradation also determines how much work you have to put in order, um, to reduce that gradation. (Lea, psychologist, 33 years old)

(...) yet the problem around his pain experience and his cognitions were much stronger, and that we did not get that turned around in the LC-VR program, not even a start with that. (Anna, psychologist, 59 years old)

Work factors

According to the professionals, the LC-VR program will be useful for patients with work participation as their **treatment goal**, patients who are **willing to return to work**, and patients who already **have made steps towards work reintegration**.

(...) someone who's also more open to it... like, I want to do this quickly and I also want to get back to work quickly. (Anna, psychologist, 59 years old)

When there is a **bad relationship with the employer**, and when the patient is **more than 1 year out of the work situation**, the C-VR program was supposed useful.

Sometimes they've been at home for even longer, meaning they've been out of the work environment for longer, perhaps then it all gets worse in their head, so they're no longer able to pick up the thread, yes, I think that could really be one of the factors. (Anna, psychologist, 59 years old)

Other codes and quotations referring to patient factors can be found in [Table 2](#).

Content

Patients stated which content was useful or not useful for them in achieving their treatment goals. Some patients reported that they had found all of the content useful, i.e., the **whole program**; and some patients mentioned that some content had been partly useful and/or not useful ([Table 3](#)). In addition, some patients stated that the group education sessions and sessions with psychologist had been useful at the start of the program, but not at the end (i.e., content saturation):

I found it useful, but at a certain point, it all became much of a muchness, if you know what I mean. At a certain point, you know what kind of pain Peter has and what kind of pain Paul has. (Ron, patient, 59 years old, allocated to LC-VR)

In contrast, some patients said that the relaxation sessions had not been useful at the start of the program, but they had been useful at the end:

Um ... eventually, yes. In the beginning, I thought it was really bad. I felt like, 'What am I doing here?'. (Izzy, patient, 51 years old, allocated to C-VR)

Dosage

All patients stated that the dosage of the program they had followed easily fitted in their week schedule.

Yes, it was easy. Yes, I had to go along two mornings a week, and yes, in principle I also got time off work. (Ava, patient, 31 years old, allocated to LC-VR)

I went twice a week, yeah, so my employer gave me the chance to go along. (Tess, patient, 52 years old, allocated to C-VR)

Among the patients, however, there was a wide range of opinions about the optimal **dosage** of the program (if they had the chance to change it). Some examples: some patients desired more training days per week, some patients desired more contact hours per training day, some patients desired a shorter program duration (in weeks), or patients stated that the dosage was just good as they received it. These statements about program dosage were similar for both programs. Furthermore, as already mentioned ([Table 3](#)), patients stipulated a wide range of opinions about useful and not useful content. We coded not useful content as **redundant care**.

Dosage of C-VR program

Concerning the usefulness of the dosage of the C-VR program, the patients and the professionals agreed that no more treatment hours were needed to achieve better results. In fact, it was suggested that **the C-VR program could be slightly shorter** (PT, PR), and that **less complex patients would probably benefit from a shorter program** (PR, MA).

I think that all of us, in principle, could have achieved the same result in fewer hours, I do think that, but how many hours, I don't know, but I do think less. (Jacob, physiotherapist, 30 years old)

That period of 15 weeks is, in my opinion, also a bit arbitrary, perhaps it could be done in 12 weeks. (...) I think that you could look more critically at whether it's always necessary to have 100 hours, does someone really need those 15 weeks or could they stop sooner, could more re-integration take place sooner? (Ellen, psychologist, 35 years old)

On the other hand, some professionals stated that having 100h gave them enough space to deliver **tailored care**, and

enough time to perform physical training principles, achieve behavioral change, explain the sensitization story, encourage patients to take up healthy behavior, explore extra interventions, deal with the appearance of an unforeseen co-morbidity, or build a relationship with the employer (Quotations: Online Resource 4).

You have a better overview of someone, otherwise it's a very short time to get to know someone really well, learn how they think and what their personality is like, how they cope, you need a bit more time for that, otherwise I think it would become a very physical story and the rest, well, there'd simply be little time for it. (Anna, psychologist, 59 years old)

But we see that the physical and the mental go hand in hand, of course, such as physically non-specific lower back pain, if someone has been suffering that for six months, then you also have to get the sensitization story out of the brain, that's something you actually have to build up step-by-step in the training, so it's not the case that if someone doesn't have a disorder, they'll be able to finish sooner. It really is a combination with mental and behavioral. (Carol, physiotherapist, 43 years old)

Dosage of LC-VR program

Concerning the usefulness of the dosage of the LC-VR program, there was a discrepancy between patients and professionals. The patients stated that the dosage they received was appropriate to achieve their treatment goal(s). Remarkably, some patients revealed that **not all intervention modules they received were useful** for them (see Table 3). In fact, these patients could receive **less treatment hours** to achieve the same (positive) results. On the other hand, the professionals stated that the dosage of the LC-VR program was generally **too low** for the majority of people who are referred to VR.

I think that 40 hours is very tight if you really want to change behavior. I wonder whether it's feasible, now I've done it like that twice and also kept more of an eye on how it's done. I think it's very tight. (Jill, physiotherapist and reintegration specialist)

Other codes and quotations referring to the dosage of the LC-VR/C-VR programs can be found in Online Resource 4.

Feasibility

Satisfaction

Patients **rated** the LC-VR program as positive (mean: 8, min-max: 7–9), and the C-VR program as positive (mean: 7.8, min-max: 4.5–9). Patients had **positive and negative experiences** with both programs:

I'm really satisfied, yeah. I'm extremely satisfied, it did me a lot of good. (Alice, patient, 46 years old, allocated to C-VR)

I found that from the beginning, quite a bit was said about the fact that, yeah, it might all be in your head, if you've been in pain for that long you think you're still in pain, and in my case, I didn't believe that beforehand, and hearing that there might be no treatment for you left or there not being any other options, yeah, I simply didn't know about that, so when I began, I thought that I really would get better and would also be able to do more, and during the course I found that, if I said I really was in pain and that I wasn't able to do things properly, that it was often ignored. (Lauren, patient, 33 years old, allocated to C-VR). *Note: this patient left the program early because a serious medical problem appeared that had not previously been detected.*

I'm certainly satisfied, I got lots out of it and learned loads. (Ava, patient, 31 years old, allocated to LC-VR)

No, because I think I did it, of course, in the hope that it would get better, but OK, it didn't work out, even though I did all the exercises. I

did it at home, too, I was also given little exercises to do, I did them all properly. (...) one explanation is that I probably have arthrosis all over my body, wear, I have it everywhere. (Owen, patient, 63 years old, allocated to LC-VR). *Note: this patient switched to the C-VR program because he did not achieved his treatment goals. However, this patient did not achieve his treatment goals in the C-VR program, either.*

Professionals had **positive and negative experiences** with the LC-VR program:

I think it's useful in that sense, because you look very specifically at, well, what's important for this client, so you really, so you make the patient dependent, and that, in any case, someone doesn't get something that they don't need so much, and what I also found kind of useful was that the client takes charge of doing things at an earlier stage, which means that we're spoon-feeding them a bit less. (Ellen, psychologist, 35 years old)

We took him/her out of the trial at a certain point, because we saw that, and coincidentally, another specific diagnosis was also made, so he/she had to go, but we were also very pleased that he/she went, because we actually needed more time. (Jill, physiotherapist and reintegration specialist, 39 years old)

The professionals had positive experiences with patients who were allocated to **the C-VR program** as part of the RCT [23].

Intention to continue use

The patients stated that they would follow the program (LC-VR, C-VR) again if it proved necessary, and that they would **recommend** the program to family, friends, colleagues, etcetera, if necessary. The professionals preferred to continue using the C-VR program in clinical practice. Some professionals and managers would be **willing to work with the LC-VR program in the future**, if there were resources for this and adaptations were made (see "Factors affecting ease or difficulty of implementation" and "Adaptations"). One manager (from a non-participating RCT center) would be willing to implement the LC-VR program (or a similar program) as his/her new care-as-usual program. Another manager, also from a non-participating RCT center, would be willing to continue using the LC-VR program, since his/her center recently implemented a similar program.

Other codes and quotations referring to intention to continue use can be found in Online Resource 5.

Perceived appropriateness

The professionals mentioned that one single program (i.e., LC-VR or C-VR) would not be useful, and thus not appropriate, for all patients referred to VR. However, the professionals described the **C-VR program as the most appropriate program** for patients referred to VR, for the following reasons: having **enough time** (Online Resource 4), because the C-VR program was the **current** and thus "**known**" program (for both professionals and referrers), for **logistical reasons**, and because the program is **financially beneficial**.

If I had to state a preference, I would say, goodness, I would go for the 100-hour program, because you can always tailor it. (Lynn, reintegration specialist, 42 years old)

I would probably choose the current program and that's particularly to do with, well, yes, who I am as a person, I tend to prefer to take the familiar path, it's easier to fall back on that. (Karen, reintegration specialist, 40 years old)

From an organizational point of view, it is really a lot easier, because it's simply a fixed program for all of the patients who are in the group. (Karen, reintegration specialist, 40 years old)

Other codes and quotations referring to perceived appropriateness can be found in Online Resource 5.

Positive and negative effects on target participants

Patients, professionals and managers mentioned several positive and negative effects of both programs on the target participants (i.e., patients). A lot of positive factors of the LC-VR program were associated with the **dosage** (time schedule) of the program. The positive factors were: **less time absent from work** (PR, MA), **more time for reintegration to work** (PA, PR, MA), **less intensive for patient** (PA, PR, MA), **rehabilitate in home situation**

(PA), **create pressure/prevent therapy dependency** (PR, MA), and **increase self management of patients** (PA, PR).

Well, what I also found useful was that the client takes charge of doing things at an earlier stage, which means that we're spoon-feeding them a bit less. (Ellen, psychologist, 35 years old)

There came a time when, more like the rest, I was already at work more and was also coming up against things, and in that way, yeah,

Table 4. Positive and negative effects of the C-VR and LC-VR programs on patients.

	Barrier / Facilitator	Participant	Quotation
C-VR			
Not forced to think critically about dose	Barrier	Ellen, PR	I think that you could look more critically at whether it's always necessary to have 100 hours, does someone really need those 15 weeks or could they stop sooner, could more re-integration take place sooner?
Program is too uniform	Barrier	Karen, PR	At present, it's all very standard. I think that at the least, we could look at making the content more tailored, and get away from the kind of one-size-fits-all that we have now.
	Barrier	Tim, MA	At present, it's really a hit-and-miss approach and I'd want to use interventions in a more targeted way.
Redundant care	Barrier	Rudy, MA	At the same time, we also see clients who we're currently putting in the full program, of whom we say, actually, a little less would also have been fine.
Therapy dependency	Barrier	Jacob, PR	What we do see in the longer program, or in any case the normal one ^b , is that people do build up a certain degree of dependence on the guidance, on the therapy and all.
Tailored care	Facilitator	Karen, PR	Look, if we're not sure whether certain parts will be feasible, then I also think yes, you know, we do want to have a go, say, a certain part that might be too much for someone, we can leave that bit out, it's not the case that the program per se has to run the way it was conceived, we can make adjustments to it, and if we want to stop earlier or even keep going for a bit longer, then we have that option.
	Facilitator	Izzy, PT	Because it is really clearly focused on the individual, personally. And yes, that the assumption is that they look at what you can do, not at what you can't do.
Rehabilitation in a group	Facilitator	Tess, PT	You recognize a huge number of things that in the beginning, you always thought yourself, that it was to do with you and only you feel that, but that's not the case at all. Everyone is dealing with the same problem, in fact. So that was great, being able to recognize things in other people.
LC-VR			
Time schedule (dosage)	Facilitator	Ron, PT	It's really nice to be able to do those exercises at home, I was shown how to do all of them and then I was able to do them all by myself, yeah, I enjoyed that, then I didn't need to spend whole days there, say, four or five hours at a time, but normally just two or three hours.
	Facilitator	Lea, PR	Due to having less contact time, well, I think you're more concentrated as a result, I think that's the general added value. Clients and coaches and trainers are less able to – now, how to put it – delay things for you, wait for you.
Less time spent absent from work	Facilitator	Kim, PT	There came a time when, more like the rest, I was already at work more and was also coming up against things, and in that way, yeah, you could share that with the group, also with the people from the [name of the rehabilitation center], in order to look at how best to deal with things if you found yourself in that kind of situation.
	Facilitator	Lynn, PR	People have a bit more time to reintegrate, so you can make more time and space for that.
Prevention of therapy dependency	Facilitator	Lea, PR	... and also, that you simply empower people that way, yeah, that you can simply keep living your own life and you also have to keep on doing sports as normal, you establish a framework in that way. That they have to do it themselves. Less dependence is created.
Increase self-management	Facilitator	Kim, PT	I also learned to still do quite a lot myself.
	Facilitator	Ellen, PR	Well, what I also found useful was that the client takes charge of doing things at an earlier stage, which means that we're spoon-feeding them a bit less.
Tailored care	Facilitator	Ava, PT	They looked specifically at what would suit me in terms of group training, because I didn't have to take part in everything. So, I did find that positive, because why should you take part in things that might not be suitable or meant for you? That might be a waste of your time.
	Facilitator	Karen, PR	The advantages were that it's a shorter program that's much more tailored to the individual, from the Quicksan ^a you're looking at what the person needs and how we're going to do that.
Rehabilitation in a group	Facilitator	June, PT	I think that it's very good that it's in a group and I was lucky that there were two girls of my age, who I could get along with very well. I think that all ensures that, yeah, we supported each other a lot and, you know, if someone was having a bad day, the others cheered them up, and that was really nice.

C-VR: comprehensive vocational rehabilitation; LC-VR: less comprehensive vocational rehabilitation; PT: patient; PR: professional; MA: manager.

^aQuicksan is the center name for the multidisciplinary screening.

^bC-VR was meant here.

you could share that with the group, also with the people from the [name of the rehabilitation center], in order to look at how best to deal with things if you found yourself in that kind of situation. (Kim, patient, 28 years old, allocated to LC-VR)

Another positive factor of the LC-VR program was that it increased the **awareness** of the professionals about the question: **what content does a patient need?** (PR). In line with the former factor, all actors stated **tailored care** as a positive factor of the LC-VR program. A final positive factor mentioned by the patients was **rehabilitating in a group** and consequently the presence of **fellow patients**. The LC-VR program resulted also in some negative factors for patients. First, the patients in the LC-VR program rehabilitated (partly) **separated from the group** in the RCT (PA, PR). Consequently, patients rehabilitated less hours per training day compared with the patients of the C-VR (care as usual) program. For instance, they started after the other patients of their group were already started, or they were absent at particular content, such as relaxation, group education, or fitness. A professional stated that this situation took **too much extra attention** from him. A second negative factor mentioned by the professionals was that 40 h is **too less time** to achieve treatment goals, and having too less attention for the patients (PR). The final negative factor of the LC-VR program on patients was **redundant care** (Table 3).

Tailored care (PT, PR) and **rehabilitation in a group** (PT, PR) were mentioned as positive effects of the C-VR program.

Look, if we're not sure whether certain parts will be feasible, then I also think yes, you know, we do want to have a go, say, a certain part that might be too much for someone, we can leave that bit out, it's not the case that the program per se has to run the way it was conceived, we can make adjustments to it, and if we want to stop earlier or even keep going for a bit longer, then we have that option. (Karen, reintegration specialist, 40 years old)

You recognize a huge number of things that in the beginning, you always thought yourself, that it was to do with you and only you feel that, but that's not the case at all. Everyone is dealing with the same problem, in fact. So that was great, being able to recognize things in other people. (Tess, patient, 52 years old, allocated to C-VR)

The negative effects of the C-VR program included the creation of **therapy dependency** (PR, MA), that there is **more room (time) to take it easy** and to take your **responsibility** (PR), that there is too much **pampering** in the program (MA), and the fact that one is not forced to **think critically** about which content a patient really needs (PR). A further negative effect was **redundant care** (i.e., partly/not useful content) (PT, PR, MA) and as a consequence of this, the fact that the program is too **uniform** (PR, MA).

At present, it's all very standard. I think that at the least, we could look at making the content more tailored, and get away from the kind of one-size-fits-all that we have now. (Karen, reintegration specialist, 40 years old)

What we do see in the longer program, or in any case the normal one [i.e. the C-VR program], is that people do build up a certain degree of dependence on the guidance, on the therapy and all. (Jacob, physiotherapist, 30 years old)

Other codes and quotations referring to positive and negative effects on target participants can be found in Table 4.

Factors affecting ease or difficulty of implementation

Professionals and managers mentioned several implementation factors. Proper **reimbursement** of the LC-VR program was mentioned as being of paramount importance (PT, MA). The reimbursement of the **RTW coordination** module was stated as a key

implementation factor (PR, MA), as well as avoiding **too much diversity** in the LC-VR program (PR).

You also try to balance what is the best possible for the client against what is organizationally feasible, that's where the tension lies. (Ellen, psychologist, 35 years old)

Another implementation factor was that the two programs should be delivered **separately** (PR, MA).

You shouldn't have people who are doing a 40-hour program [i.e. the LC-VR program] and people who are doing a 100-hour program [i.e. the C-VR program] in a single group, because that gives a strange impression to clients who talk to and influence each other. (Rudy, manager, 54 years old)

The negative implementation factors for the LC-VR program included a **lack of evidence** (PR, MA) and **best practices** (MA), and the **prejudice** of professionals. The **rigid financial structure** of the Dutch healthcare system (which is unclear and can differ from year to year) was frequently mentioned as a negative factor for both programs (PR, MA).

And if it's shown that it really is much more effective than doing more hours, then it is strange that we in the Netherlands have a funding structure that makes that more likely, I think that's a bit of the worry that we'll be doing yet more hours. We know that it doesn't make any sense, but then we do get slightly higher rates. Yes, that's of course really stupid. (Alex, manager, 47 years old)

Other codes and quotations referring to factors affecting ease or difficulty of implementation can be found in Online Resource 5.

Adaptations

Patients, professionals, and managers suggested several adaptations with regard to content and delivery that they thought would optimize the LC-VR and/or C-VR program.

Content. Professionals suggested to make the LC-VR program **slightly more uniform**, i.e., not to have too much differentiation in content of the LC-VR program. To improve this it was suggested that professionals could choose out of a number of "blueprinted" programs.

There you'd probably look for something more, yeah, not that one-size-fits-all, but, say, something in between, that can be set up well, especially in a scheduling, organizational sense (...) you could maybe work towards having a few standard forms, two or a maximum of three, where you could rehabilitate people if you took the structure, if you took the planning into account, then it would probably be more manageable. (Karen, reintegration specialist, 40 years old)

It was suggested to make the **RTW coordination module** obligate in C-VR (PR). This means that a patient can only be included in the program if his/her RTW coordination module is reimbursed. Another adaptation of the C-VR program was to make the program **more tailored based** (PR). In line with this, it was suggested to choose out of **more content** compared with the current program content (PR, MA).

I think it's desirable to, say, take a more targeted approach, use more targeted resources, I think that at the moment, in any case, we really take a hit-and-miss approach, and I would want to use interventions in a more targeted way. (Tim, manager, 45 years old)

Delivery. Two similar codes for both programs emerged. First, it was stated that the **program duration could be declined** to 10–12 weeks (PR). In line with this code it was suggested for the C-VR program to make the **program duration flexible** (PR).

Someone might also be able to come a long way in 12 weeks. (Lynn, reintegration specialist, 42 years old)

What we're thinking about now, in any case, is do we want to offer 15 weeks per se, or shall we leave it more open, so that after some time we think about how far someone has come and look at whether they have already achieved their goals, or where they have come from and how long you will keep going, that you're also more flexible about this. (Karen, reintegration specialist, 40 years old)

The second adaptation was to execute the **most relevant education themes in the first weeks of the program** (PR). It was firmly suggested to deliver LC-VR **separate from C-VR** (PA, PR, MA).

The way it is now, that you have people doing the 40-hour program in the same space as those doing the 100-hour one, and those doing the 100 go swimming and you have to say to those doing the 40, sorry, that's not possible in your program, that feels really stupid, so you should actually have separate groups, I think. (Jill, physiotherapist and reintegration specialist, 39 years old)

There were two opinions about how to operationalize separate groups in clinical practice. One opinion was that program **differentiation could take place after a multidisciplinary screening** (PA, PR), eventually assisted by **cut off scores** from patient reported outcome measures (PR) The other opinion was that differentiation could not take place after a multidisciplinary screening (PR). The former opinion stated that a **multidisciplinary screening does not gives the whole picture** (PR). An **observation phase** (PR) was suggested to decide after a couple of weeks -after the start of a program- which program will be the most appropriate for the patient.

Within pain rehabilitation, for example, for some time they had an observation phase of three weeks, and if I think about that now, then I think, hey, you can also see a bit whether people pick things up, so you might able to do something like that, an observation phase lasting a few weeks and then decide whether it's going to be 40 or 100 hours. (Ellen, psychologist, 35 years old)

If the LC-VR program will be delivered as a separate program, a **group size** of 8-10 patients was appropriate according to the professionals. Another adaptation was to make an **escape option** possible, thus the possibility to extend the LC-VR program (for instance up to 50-h) (PR). According to the C-VR program, an adaptation mentioned by the professionals was a **descending frequency** of the C-VR program at the last weeks of the program.

For us, the pattern is that from beginning to end, you come twice a week, and you could also cut that back over time, for example, so you could say that for so many weeks, you come twice a week, and perhaps at the end you come just once a week, and do the other day something for yourself, at least that's an approach that I think certainly wouldn't do any harm. (Karen, reintegration specialist, 40 years old)

Other codes and quotations referring to adaptations of the LC-VR/C-VR programs can be found in Online Resource 6.

Discussion

This study provided insights into the usefulness and feasibility of C-VR and LC-VR for patients with CMP and reduced work participation, from the perspective of patients, professionals, and managers.

Usefulness

Five categories of patient factors (intelligence, behavioral, complaints, mental and work) were identified from the interviews with professionals. It was suggested that these patient factors could indicate which program would be useful for which type of patient. Our findings on the "behavioral," "complaints," and "mental" patient factors were consistent with the findings of other qualitative studies assessing patients' case complexity [30–32]. "Intelligence" (i.e., high

level of education) [33] and "work" [4,33,34] were predicting factors for RTW in other studies. Unfortunately, because the professionals had little experience with patients who participated in the LC-VR program (Table 1), this hampered their possibility to give more insights about which patient factors could be used for stratification purposes. Insights from professionals with experiences in similar less comprehensive programs would thus be desirable.

A further "usefulness theme" in the present study concerned the content of the programs: a homogeneous pattern of "useful," "partly useful," and "not useful" content emerged for the two programs. The findings on content are in line with those of other studies [4,7,8], showing that bio-psychosocial multidisciplinary (VR) programs are effective for people with CMP and impaired work participation. More specifically, a review has shown that implementing a multi-domain intervention with components in at least two of the following three domains – health-focused (i.e., health services intervention subcategories such as graded activity/exercise, CBT, work-hardening), service coordination (i.e., improving communication within the workplace or between the workplace and the healthcare providers), or work modification (i.e., modified duties, modified working hours, supernumerary replacements, ergonomic adjustments or other worksite adjustments) – can help reduce time lost as a result of musculoskeletal and pain-related conditions [8]. In extension of the preceding findings addressed by Cullen, our study shows that components within domains, for example education sessions within the health domain, can deviate in usefulness; not only per patient but also during an intervention period. As a result, it might be warranted to discuss the usefulness of the various components of multi-domain VR on a frequent basis with patients during an intervention period.

Regarding dosage, there was a discrepancy between the opinions of patients and those of professionals. The patients were positive about the dosage of their program regardless of the actual dosage (C-VR or LC-VR). The professionals mentioned positive and negative effects of both programs on patients, but were generally more positive about the dosage of the C-VR program and more negative about the dosage of the LC-VR program. We assume that this discrepancy stems from the fact that the patients had no experience of VR before starting their program, whereas professionals were aware of both programs and may have been biased in favor of the C-VR program. This latter finding was also observed in another study, which found that the dosage of pain rehabilitation programs executed in clinical practice was mainly based on historical grounds and clinical experience, and not on evidence [31].

Feasibility

The patients were satisfied with the program they had been allocated (LC-VR or C-VR) and considered participating in the program to be feasible. The professionals, on the one hand, were satisfied with the C-VR program, although they did not like its fixed and uniform ("one size fits all") character and wanted more flexibility, both in terms of the content and the dosage of the program. On the other hand, the professionals had mixed views on the LC-VR program. The main argument made by professionals who had negative experiences with the LC-VR program was that it did not provide enough time to change the behavior of patients. Over the last decade, however, many RCTs [13,14,16] and systematic reviews [7,10–12] have shown that similar shorter programs can result in positive (i.e., non-inferior) outcomes on return to work. This evidence means however not that shorter, less-extensive programs are always better than comprehensive programs. Moreover,

sub-group analyses have shown that the most complex cases benefited more from an extensive program [15,35,36]. Complex cases were described as patients with a poor prognosis classification (from a screening instrument consisting of a combination of psychological, motivational, and physiotherapy factors) [15], depressed comorbidity [35], low job satisfaction, low work autonomy, no interest in returning to the same job, and those at risk of losing their job [36]. These findings on case complexity stipulates the urgency of stratification of patient groups into different types of programs. This was also mentioned as an important implementation factor by professionals and managers.

The managers expressed positive intentions to implement the LC-VR program in their centers (alongside the C-VR program). However, all of the managers stated that it would not be financially feasible to implement the LC-VR program, due to the structure of the Dutch healthcare system. Thus, the financial situation of the clinics could potentially be challenged by shorter programs, if they were deemed feasible. This could have influenced the answers.

Strengths and limitations

By conducting 30 interviews with three groups of key stakeholders, we were able to study a complex intervention such as VR from a number of different perspectives [17].

This number of interviews is sufficient and is comparable with other qualitative studies [37–40]. In the present study, data saturation of each stakeholder group was reached, which strengthens the findings and implications. In addition, the fact that no more than thirteen patients could be interviewed was due to the early stop of the RCT. Hence, there were no more patients available to interview. The roles (RTW coordinator, psychologist, physical therapist) of the interviewed professionals were evenly spread, which enriched these results. Of the patients who participated, ~31% were males and ~69% were females, which reflects “real world” clinical practice and thus offers a good representation of the population. A further strength of the present study was that the interviews were conducted with stakeholders who had real experience of the programs of interest, enabling our findings to be transferred effectively to clinical practice. A final strength was that we used an inductive thematic analyses approach, which resulted in a coding scheme that was based on the collected data (i.e., data-driven [29]), and not based on pre-existing ideas or hypotheses for example. The inductive approach enriched our findings and resulted in new ideas which can be used to generate future research aims.

There are also several limitations to the present study. The first is that patients who were allocated to the LC-VR program rehabilitated in the same group as patients rehabilitating in the “care-as-usual” C-VR program (and who were not included in the RCT). For financial reasons, it was not possible to create separate groups of LC-VR and C-VR patients. This flaw in the design of the RCT may have negatively influenced the experiences of patients and professionals participating in the present study. A second limitation relates to the limited experience of the professionals with the LC-VR program, which in turn limited their ability to reflect on the program. A further limitation is that recall bias may have occurred, as the period of time between the interviews and completion of the VR program was on average twelve months (patients) and six months (professionals and managers). However, another qualitative research study of the support needs of survivors of critical care found no difference in the stories of patients who underwent critical care up to five years previously [41]. This would suggest that our findings are reliable. Finally, our study

was conducted in the Netherlands and therefore framed by the Dutch sickness compensation and healthcare system. We presume, however, that our findings are also representative of contexts beyond the Dutch system.

Clinical implications

From the interviews with the patients it can be stated that multi-disciplinary VR programs could be group-based and could consist, at a minimum, of RTW coordination (communication part) and fitness sessions. Group-based education could be provided in the first weeks of the program. Other content, such as CBT, RTW coordination (ergonomic part), and relaxation sessions could be delivered to patients on a tailor-made basis. The professionals and managers stated that program differentiation –based on various patient factors– might be advisable. Hence, taking the findings of the present study as a whole, it is recommended to conduct flexible VR on a tailor-made basis. In order to put this into practice, we propose the following three steps: Step 1. Differentiate between C-VR and LC-VR. The patient factors proposed in the present study might assist when making this choice. Step 2. Professionals should choose from three or four blueprint programs. Step 3. Execute the program and evaluate the program together with the patient at fixed time-points (for example, after four and eight weeks). At these evaluation moments, the decision can be made to continue with or change the content and/or dose.

A final clinical implication is that key stakeholders, such as professionals, managers, and referrers, should be given clear information about the evidence underpinning a new program. In addition to all of the proposed clinical implications, however, it is of paramount importance that sickness compensation and healthcare systems facilitate the proposed changes and resources. Unless this is the case, such changes will not be feasible.

Conclusion

The patients found both programs to be feasible and generally useful. The professionals preferred working with the C-VR, but they disliked the fixed and uniform character of the program. They also mentioned that this program was too extensive for some patients, and that the latter would probably benefit from the LC-VR program. Despite their positive intentions, the managers stated that due to the Dutch healthcare system, it would not be financially feasible to implement the LC-VR program. The main conclusion of this study is that it is not deemed useful to have one specific VR program for all patients with CMP and reduced work participation, and that flexible and tailored-based VR would thus be warranted.

Note

1. See also Online Resource 2.

Ethical approval

All procedures performed were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The Medical Ethical Committee of the Academic Medical Center, Amsterdam, the Netherlands, authorized this study and decided that a full application was not required.

Disclosure statement

The authors report no conflicts of interest.

Data availability

The data that support the findings of this study are available from the corresponding author, MFR, upon reasonable request.

Informed consent

Informed consent was obtained from all individual participants included in the study.

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